

What is claimed is:

1. A valve assembly comprising:

a housing having a flow channel and an annular surface surrounding the flow channel;

a slide plate located in the housing and movable transversely to an axis of the flow channel between a closed position, in which the slide plate blocks flow through the flow channel, and an opened position, in which the slide plate allows flow through the flow channel; and

a seal ring positioned between the annular surface of the housing and the slide plate;

wherein at least one of the slide plate and the seal ring includes at least one passageway for increasing conductance between the slide plate and the seal ring.

2. A valve assembly according to claim 1, wherein seal ring includes a first side extending generally parallel with the axis of the flow path, a second side spaced radially outwardly from the first side and extending generally parallel with the axis of the flow path, a first surface extending between the first and the second sides and facing towards the annular surface of the housing, and a second surface axially spaced from the first surface and extending between the first and the second sides and facing towards the slide plate, wherein the second surface includes a continuous annular sealing portion for contacting the slide plate when the seal ring is biased against the slide plate, so that a fluid-tight seal can be formed between the continuous annular sealing portion and the slide plate, and the at least one passageway is positioned between the annular sealing portion and the second side of the seal ring for increasing conductance between the seal ring and the slide plate prior to the annular sealing portion contacting the slide plate.

3. A valve assembly according to claim 2, wherein the passageways are of equal size and are successively spaced in an annular pattern about the seal ring.
4. A valve assembly according to claim 2, wherein the passageways of the seal ring extend between the second surface of the seal ring and the second side of the seal ring.
5. A valve assembly according to claim 4, wherein the passageways of the seal ring each comprise a depression in the second surface of the seal ring that extends to the second side of the seal ring.
6. A valve assembly according to claim 2, wherein the passageways of the seal ring each comprise a depression in the second surface of the seal ring positioned between the second side of the seal ring and the annular sealing portion of the second surface of the seal ring.
7. A valve assembly according to claim 2, wherein the passageways of the seal ring each extend between the second surface of the seal ring and the first surface of the seal ring.
8. A valve assembly according to claim 1, wherein the seal ring has a nipple extending coaxially into the flow channel.
9. A valve assembly according to claim 8, wherein the nipple has an annular groove in an outer surface of the nipple, and an o-ring is located in the groove.
10. A valve assembly according to claim 2, wherein the annular sealing portion of the second surface of the seal ring has an annular groove, and an o-ring is located in the groove.
11. A valve assembly according to claim 1, wherein the slide plate is pivotally movable into the flow channel.
12. A valve assembly according to claim 11, wherein the slide plate is pivotally movable between a position out of the flow channel, and the opened position where the slide plate is pivoted into the slide channel but disengaged from a valve seat of the housing, and then

laterally movable with respect to the axis of the flow channel to a closed position engaged with the valve seat.

13. A valve assembly according to claim 12, further comprising a shaft fixedly coupled to the slide plate through a pivot arm extending generally laterally from the shaft, the shaft at least partially mounted within the housing to rotate about a longitudinal axis of the shaft to allow the slide plate to rotate into the flow channel to the opened position, and also slide substantially parallel to the axis of the flow channel to allow the slide plate to move longitudinally between the opened position and the closed position.

14. A valve assembly according to claim 13, further including a cam mechanism coupled between the shaft and the housing to provide a combination of rotational movement and sliding movement of the shaft.

15. A valve assembly according to claim 14, wherein the cam mechanism comprises:
a cam surface defined by the housing; and
a cam follower fixed to the shaft and engaging the cam surface of the housing.

16. A valve assembly according to claim 1, further comprising a plurality of fasteners displaceably arranged in a plurality of holes of the annular surface of the housing and wherein the slide plate is secured to the fasteners.

17. A valve assembly according to claim 16, wherein the slide plate is removably secured to the fasteners.

18. A valve assembly according to claim 16, wherein the housing further includes an annular chamber which coaxially surrounds the flow passage and into which the holes formed in the annular surface open, and wherein the valve assembly further comprises an annular piston located in the annular chamber and connected to the fasteners.

19. A valve assembly according to claim 18, wherein the housing further includes at least one conduit in fluid communication with the annular chamber.

20. A valve assembly according to claim 18, further comprising a plurality of springs contained within the chamber and biasing the piston towards the seal ring.

21. A high purity gas delivery system including a valve assembly according to claim 1, and further including a process chamber connected to a vacuum pump through the valve assembly.

22. A valve assembly comprising:

a housing having a flow channel having an inlet and an outlet;

a seal ring positioned between the inlet and the outlet and including,

opposing first and second sides,

a first surface extending between the first and the second sides and facing towards the inlet of the housing,

a second surface axially spaced from the first surface and extending between the first and the second sides and facing towards the outlet of the housing, wherein the second surface includes a continuous annular sealing portion and at least one passageway positioned between the annular sealing portion and the second side.

23. A valve assembly according to claim 22, wherein the second surface of the seal ring includes a plurality of the passageways positioned between the annular sealing portion and the second side.

24. A valve assembly according to claim 23, wherein the passageways are of equal size and are successively spaced in an annular pattern about the second surface of the seal ring.

25. A valve assembly according to claim 22, wherein the passageway of the seal ring extends between the second surface of the seal ring and the second side of the seal ring.

26. A valve assembly according to claim 25, wherein the passageway of the seal ring comprises a depression in the second surface of the seal ring that extends to the second side of the seal ring.

27. A valve assembly according to claim 22, wherein the passageway of the seal ring comprises a depression in the second surface of the seal ring positioned between the second side of the seal ring and the annular sealing portion of the second surface.

28. A valve assembly according to claim 22, wherein the passageway of the seal ring extends between the second surface of the seal ring and the first surface of the seal ring.

29. A valve assembly according to claim 22, wherein the seal ring has a nipple extending from the first surface of the seal ring.

30. A valve assembly according to claim 29, wherein the nipple has an annular groove in an outer surface of the nipple, and an o-ring is located in the groove, and wherein the annular sealing portion of the second surface of the seal ring has an annular groove, and an o-ring is located in the groove.

31. A valve assembly according to claim 22, wherein the annular sealing portion of the second surface of the seal ring has an annular groove, and an o-ring is located in the groove.

32. A seal ring comprising:

opposing first and second sides,

a first surface extending between the first and the second sides,

a second surface axially spaced from the first surface and extending between the first and the second sides, wherein the second surface includes a continuous annular sealing portion and at least one passageway positioned between the annular sealing portion and the second side.

33. A seal ring according to claim 32, wherein the second surface includes a plurality of the passageways positioned between the annular sealing portion and the second side.

34. A seal ring according to claim 33, wherein the passageways are of equal size and are successively spaced in an annular pattern about the second surface.

35. A seal ring according to claim 32, wherein the passageway extends between the second surface and the second side.

36. A seal ring according to claim 35, wherein the passageway comprises a depression in the second surface that extends to the second side.

37. A seal ring according to claim 32, wherein the passageway comprises a depression in the second surface of the seal ring positioned between the second side and the annular sealing portion.

38. A seal ring according to claim 32, wherein the passageway extends between the second surface and the first surface.

39. A seal ring according to claim 22, further comprising a nipple extending from the first surface.

40. A seal ring according to claim 39, wherein the nipple has an annular groove receiving an o-ring, and the annular sealing portion of the second surface has an annular groove receiving an o-ring.

41. A valve assembly comprising:

a housing having a flow channel and an annular surface surrounding the flow channel; and

a slide plate located in the housing and movable transversely to an axis of the flow channel between a closed position, in which the slide plate blocks flow through the flow channel, and an opened position, in which the slide plate is moved towards the annular surface and allows increased flow through the flow channel;

wherein at least one of the slide plate and the annular surface includes at least one passageway for increasing conductance between the slide plate and the annular surface.

42. A valve assembly according to claim 41, wherein the passageway is provided in the annular surface.

43. A valve assembly according to claim 42, wherein the annular surface includes a plurality of the passageways.

44. A valve assembly according to claim 41, wherein the passageway is provided in the slide plate.

45. A valve assembly according to claim 44, wherein the slide plate includes a plurality of the passageways.